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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/640,479	08/16/2000	Kyung-Su Park	40056/DBP/Y35	4548
23363	7590	11/10/2003	EXAMINER	
ZIMMERMAN, GLENN				
ART UNIT			PAPER NUMBER	
2879				

DATE MAILED: 11/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/640,479

Applicant(s)

PARK, KYUNG-SU

Examiner

Glenn Zimmerman

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-17 is/are rejected.
- 7) ☒ Claim(s) 1 and 12 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0703.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

Claims 1 and 12 are objected to because of the following informalities: In claims 1 and 12 line 1, the examiner suggests changing "fluorescent" to -- fluorescent --. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,2, 4-6, 8-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view Tatsuda et al. U.S. Patent 4,972,116.

Regarding claim 1, Mera et al. teaches a vacuum (**col. 5 line 21**) fluorescent display (**title**) comprising: a pair of substrates (**cover plate and base plate Fig. 3 ref. 12 and ref. 11 respectively**) an evacuated envelope (**vacuum casing Fig. 3 ref. 13**);

An electron emissive (**filament cathodes Fig. 3 ref. 22**) means for emitting electrons when a negative potential (**Fig. 4**) is applied;

A display means (**fluorescent material layer Fig. 3 ref. 19; anode segment ref. 18**) provided on one of the substrates in the evacuated envelope for receipt of a positive

display, characters, figures and symbol images col. 1 lines 12-15; col. 4 lines 25-30) in response to electrons emitted from the electron emissive means; and

An electron control means (**mesh shaped diffusion electrode ref. 28**) for generating a repulsive electric field when a negative potential (**claim 1; col. 5 lines 46-52; The diffusion electrode is negative with respect to the anode segment so there is a repulsive electric field between the diffusion electrode and the anode segment, which allows acceleration of electrons emitted from the electron emissive means, as the electrons clearly hit the phosphor/anode segments.**) is applied thereto to allow acceleration of electrons emitted from the electron emissive means in the direction of the display means,

Wherein the electron emissive means is located between the display means and electron control means (**Figs 3 and 4**), but fails to teach and side glasses surrounding an evacuated envelope. Tatsuda et al. in the analogous art teaches side glasses (**rectangular side plate Fig. 8 ref. 4**) surrounding an evacuated envelope. Additionally, Tatsuda et al. teaches incorporation of such a side glass to improve hermetically sealing of the envelope and also provide side walls to allow for depth in the device and a vacuum in the device (**col. 1 lines 34-37**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use side glasses surrounding an evacuated envelope in the evacuated envelope of Mera et al. since such a modification would improve hermetically sealing of the envelope and also provide side walls to allow for depth in the device and a vacuum in the device as taught by Tatsuda et al.

Regarding claim 2, Mera et al. discloses the vacuum fluorescent display as recited in claim 1, wherein the electron control means is mounted on the substrate (**col. 5 lines 4-10**).

Regarding claim 4, Mera et al. discloses the vacuum fluorescent display as recited in claim 2, wherein a negative potential is applied to the electron control means (**col. 5 lines 14-20 and 45-50**). The diffusion electrode ref. 28 is at a negative potential relative to the anode's potential.

Regarding claim 5, Mera et al. discloses the vacuum fluorescent display as recited in claim 1, wherein the electron control means is a plurality of grids which are shaped as a mesh (**diffusion electrode net, grid or honeycomb of coarse meshes ref. 28**).

Regarding claim 6, Mera et al. discloses the vacuum fluorescent display as recited in claim 1, wherein the electron control means is a layer of a transparent electrically conductive material (**nesa col. 7 lines 2-3**).

Regarding claim 8, Mera et al teaches all the limitations of claim 8, but fails to teach a control electrode means, located near the electron electron emissive means, for control of trajectories of electrons emitted from the electron emissive means. Tatsuda et al. in the analogous art teaches a control electrode means (**control grid Fig. 8 or 12 ref. 8; shield body and dome-shaped mesh portions Fig. 15 ref. 25 and 24 respectively; col. 2 lines 1-5; col. 8 lines 42-57; col. 7 line 40**), located near the electron electron emissive means, for control of trajectories of electrons emitted from the electron emissive means. Additionally, Tatsuda et al. teaches incorporation of such

a control electron means to minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented (**col. 4 lines 49-56**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the control grid in the fluorescent display tube of Mera et al and Tatsuda et al. since such a modification would minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented as taught by Tatsuda.

Regarding claim 9, Tatsuda et al. in the analogous art teaches wherein either a positive or negative potential is applied to the control electrode means (**col. 2 lines 46-51**). The motivation for combination is the same as that in claim 8. The potential is positive relative to the cathode but negative relative to the anode, so both potentials negative and positive work. If the control grid was positive relative to the anode then the device wouldn't work.

Regarding claim 10, Mera et al teaches a method of producing an image (**pattern display, characters, figures and symbol images col. 1 lines 12-15**) on a vacuum (**col. 5 line 21**) fluorescent display (**title**), comprising: providing a vacuum fluorescent display having an evacuated envelop enclosed by two substrates (**cover plate and base plate Fig. 3 ref. 12 and 11 respectively**), a display means (**fluorescent material layer Fig. 3 ref. 10; anode segment ref. 18**) provided on one of the substrates in the evacuated envelope, an electron control means (**mesh shaped**

diffusion electrode ref. 28), and an electron emissive means (**filament cathodes Fig.3 ref. 22**) located between the display means and electron control means; applying a negative potential (**Fig. 4**) to the electron emissive means to emit electrons; applying a positive potential (**Fig. 4**) to the display means to attract the emitted electrons; and applying a negative potential (**claim 1; col. 5 lines 46-52; The diffusion electrode is negative with respect to the anode segment so there is a repulsive electric field between the diffusion electrode and the anode segment, which allows acceleration of electrons emitted from the electron emissive means, as the electrons clearly hit the phosphor/anode segments; There also is no mention of current flowing from the cathode to the diffusion electrode but on the contrary from the cathode to the segment anodes col. 5 lines 15-20, so therefore the diffusion electrode repels the emitted electrons.; claim 1 discloses electrons being accelerated toward the anode segments.**) to the electron control means to repel and accelerate the emitted electrons toward the display means, but fails to teach side glass. Tatsuda et al. in the analogous art teaches side glasses (**rectangular side plate Fig. 8 ref. 4**). Additionally, Tatsuda et al. teaches incorporation of such side glasses to improve hermetic sealing of the envelope and also provide side walls to allow for depth in the device for the anode and cathode and to allow a vacuum in the device (**col. 1 lines 34-37**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use side glasses in the envelope of meta et al. since such a modification would improve hermetic sealing of the envelope and also

provide side walls to allow for depth in the device for the anode and cathode and to allow a vacuum in the device as taught by Tatsuda et al.

Regarding claim 11, Mera et al. teaches all the limitations of claim 11, but fails to teach wherein the vacuum fluorescent display further comprises a control electrode, the method further comprising applying a potential to the control electrode to control the trajectory of the emitted electrons. Tatsuda et al. in the analogous art teaches wherein the vacuum fluorescent display further comprises a control electrode, the method further comprising applying a potential to the control electrode to control the trajectory of the emitted electrons (**control grid Fig. 8 or 12 ref. 8; shield body and dome-shaped mesh portions Fig. 15 ref. 25 and 24 respectively; col. 2 lines 1-5; col. 8 lines 42-57; col. 7 line 40**). Additionally, Tatsuda teaches incorporation of such a control electrode to minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented (**col. 4 lines 49-56**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the control electrode/grid in the fluorescent display of Tatsuda et al. since such a modification would to minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented as taught by Tatsuda.

Regarding claim 12, Mera et al. teaches a vacuum (**col. 5 line 21**) fluorescent display (**title**) comprising a pair of substrates (**cover plate and base plate Fig. 3 ref. 12**

and ref. 11 respectively) and an evacuated envelope (**vacuum casing Fig. 3 ref. 13**); a display (**fluorescent material layer ref. 19; anode segment ref. 18**) provided on one of the substrates in the evacuated envelope; an electron controller (**mesh shaped diffusion electrode ref. 28**) including a plurality of grids (**mesh shaped ref. 18**), to allow repulsion and acceleration of electrons toward the display when a negative potential (**claim 1; col. 5 lines 46-52; The diffusion electrode is negative with respect to the anode segment so there is a repulsive electric field between the diffusion electrode and the anode segment, which allows acceleration of electrons emitted from the electron emissive means, as the electrons clearly hit the phosphor/anode segments**) is applied thereto; and an electron emitter (**filament cathodes ref. 22**) located between the display and electron controller, but fails to teach side glasses. Tatsuda et al. in the analogous art teaches side glasses (**rectangular side plate Fig. 8 ref. 4**). Additionally, Tatsuda et al. teaches incorporation of such side glasses to improve hermetic sealing of the envelope and also provide side walls to allow for depth in the device for the anode and cathode and to allow a vacuum in the device (**col. 1 lines 34-37**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use side glasses in the envelope of meta et al. since such a modification would improve hermetic sealing of the envelope and also provide side walls to allow for depth in the device for the anode and cathode and to allow a vacuum in the device as taught by Tatsuda et al.

Regarding claim 13, Mera et al. disclose the vacuum fluorescent display as recited in claim 12, wherein the electron controller is mounted on the substrate **(col. 5 lines 4-10)**.

Regarding claim 14, Mera et al. discloses the vacuum fluorescent display as recited in claim 12 wherein the electron controller is shaped as a mesh **(diffusion electrode net, grid or honeycomb of coarse meshes ref. 28)**.

Regarding claim 15, Mera et al. discloses the vacuum fluorescent display as recited in claim 12, wherein the electron controller is a layer of a transparent electrically conductive material **(nesa tin-oxide layer col. 7 lines 2-3)**.

Regarding claim 17, Mera et al. teaches all the limitations of claim 17, but fails to teach a control electrode located near the electron emitter to control trajectories of emitted electrons. Tatsuda et al. in the analogous art teaches a control electrode located near the electron emitter to control trajectories of emitted electrons **(control grid Fig. 8 or 12 ref. 8; shield body and dome-shaped mesh portions Fig. 15 ref. 25 and 24 respectively; col. 2 lines 1-5; col. 8 lines 42-57; col. 7 line 40)**. Additionally, Tatsuda et al. teaches incorporation of such a control electron means to minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented **(col. 4 lines 49-56)**.

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the control grid in the fluorescent display tube of Mera et al and Tatsuda et al. since such a modification would minimize electrical

trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented as taught by Tatsuda.

Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view Tatsuda et al. U.S. Patent 4,972,116 and Ge et al. U.S. Patent 5,859,508.

Regarding claim 7, Mera and Tatsuda teach all the limitations of claim 7, but fail to teach wherein the transparent electrically conductive material is tin doped indium oxide. Ge et al. in the analogous art teaches wherein the transparent electrically conductive material is tin doped indium oxide (**col. 20 lines 61-67 and col. 21 lines 1-9**). Additionally, Ge et al. teaches incorporation of such a tin dope indium oxide to improve visibility of the EFD (**col. 20 lines 61-67 and col. 21 lines 1-9**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use tin doped indium oxide in the diffusion electrode of Mera and Tatsuda since such a modification would improve visibility of the fluorescent display as taught by Ge et al.

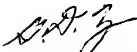
Regarding claim 16, Mera and Tatsuda teach all the limitations of claim 16, but fails to teach wherein the transparent electrically conductive material is tin doped indium oxide. Ge et al. in the analogous art teaches a transparent electrically conductive material is tin doped indium oxide (**col. 20 lines 61-67 and col. 21 lines 1-9**). Additionally, Ge et al. teaches incorporation of such a tin dope indium oxide to improve visibility of the EFD (**col. 20 lines 61-67 and col. 21 lines 1-9**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use tin doped indium oxide in the diffusion electrode of Mera and Tatsuda since such a modification would improve visibility of the fluorescent display as taught by Ge et al.

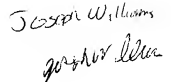
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenn Zimmerman whose telephone number is (703) 308-8991. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703) 305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is n/a.



Glenn D. Zimmerman



Joseph Williams